BACTERIAL OOZE/EXUDATE

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Several phytopathogenic bacteria cause the extrusion of viscous material from the interior of an infected region of a host plant to the plant surface through a wound or through natural openings including stomata, lenticils, and hydathodes. This viscous material is commonly referred to as bacterial ooze or exudate (1–3). Exudates are comprised of plant sap, large number of bacterial cells, bacterial extracellular polysaccharides (EPSs), and other bacterial products. The appearance of ooze occurs under humid conditions and follows the multiplication of the pathogenic bacterium to very high levels in host tissues. Exudate can be present in the form of small globules, a spreading film, streaks, or fine aerial strands (4,5) and can provide a source of inoculum borne by wind or wind-blown rain. Aerial strands of exudate can be formed by *Erwinia amylovora* on pear and apple, *Pseudomonas syringae* pv. *mori* on mulberry, and *P. syringae* pv. *pisi* on pea (3). Ooze can also stick to insects and farm implements, leading to the spread of the bacterium to uninfected parts of the diseased plant or to new, healthy host plants.

One of the most studied plant diseases where bacterial ooze is formed is fireblight of pear and apple caused by *E. amylovora* (1,6,7). Signs of fireblight on apple and pear can include cottony masses around leaf petioles and blighted fruits comprised of aerial bacterial strands. In addition, pale-yellowish, orange, light brown, or white ooze may appear on infected stems and blighted fruits. Fireblight exudate is comprised primarily of bacterial cells and EPS (in this case, amylovoran) as well as sorbitol, the principal carbohydrate transported in the vascular system of apple and other Rosaceae (5,8,9). Bacterial exudate plays an important role in secondary, and possibly, primary spread of the pathogen in orchards. Early in the flowering period, insects are attracted to the exudate present on infected branches and they become contaminated with ooze. The bacterium can then spread to the flowers when contaminated insects visit (1).

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